

Today's webinar is:

Traumatic Brain Injury 101: Screening and Assessment Methodology

Aug. 15, 2013, 1-2:30 p.m. (EDT)

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Contractor, Defense and Veterans Brain Injury Center

Moderator: Lt. Cmdr. Cathleen Shields, MS, CCC-SLP/CBIS, USPHS
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Traumatic Brain Injury 101: Screening and Assessment Methodology

- Traumatic brain injury (TBI) occurs when a sudden trauma or head injury disrupts the function of the brain. TBI is commonly known as the signature wound of the Afghanistan and Iraq conflicts.
- TBI symptoms can appear immediately after or weeks to months following the injury. The mechanism of injury and severity of the injury guide screening, assessment and the plan of care.
- This webinar includes a discussion of typical comorbid occurring conditions that present with mild TBI/concussion and the most current approaches to symptom management of "the big four" (i.e., sleep, cognition, headache and mood).
- The goal of this webinar is to enhance health care providers' knowledge of TBI and treatment for service members and veterans.

Presenter



Ms. Sherray Holland

- Ms. Sherry Holland, PA-C, supports DVBIC as the TBI Clinical Educator at DVBIC headquarters in Rockville, Md.
- Received a Bachelor of Science Physician Assistant (PA) degree and Certificate in Primary Care from Howard University in Washington, D.C., in 2004
- Board certified as a PA through the National Commission of Certification of Physician Assistants and the Maryland Board of Physicians
- Supports numerous projects within DVBIC's
 Education Division and the Defense Centers of
 Excellence for Psychological Health and Traumatic
 Brain Injury, including serving as lead content
 developer for Brainline Military online civilian
 provider courses and contributions to the
 development of patient and provider education tools
- Actively involved with the American Academy of Physician Assistants and has collaborated with their staff on military families and veterans initiatives

Traumatic Brain Injury 101

Sherray Holland, PA-C

TBI Clinical Educator Contractor, DVBIC

Disclaimer

The views expressed in this presentation are those of the presenter and do not reflect the official policy of the Defense Department or U.S. Government. This presenter has no financial interests to disclose.

Learning Objectives

This webinar will:

- Review TBI, mechanism of injury and Defense Department diagnostic criteria for mild, moderate, severe and penetrating TBI
- Explain and describe how military TBI presents in various clinical practice settings
- Compare and contrast the components of a TBI versus posttraumatic stress disorder (PTSD)
- Describe screening and assessment methods and challenges when identifying patients with TBI

Traumatic Brain Injury 101

What is Traumatic Brain Injury (TBI)?

Concussion/mTBI Definition

- Two conditions must be met to suspect/diagnose a concussion:
 - A traumatic injury mechanism/event must occur (e.g., motor vehicle crash [MVC], fall, sports, training accident, blast, etc.)
 - The person must have experienced a loss of consciousness (LOC) or an alteration of consciousness (AOC)
 - More difficult to determine when injury occurs in combat setting
 - The patient interview is key to making the correct diagnosis
 - Reported AOC requires further investigation
 - Neurological disruption versus psychological reaction

Defense Department TBI Definition

- Traumatically induced structural injury or physiological disruption of brain function as a result of external force to the head
- New or worsening of at least one of the following clinical signs:
 - Loss of consciousness or decreased consciousness
 - Loss of memory immediately before or after injury
 - Alteration in mental status (confused, disoriented, slow thinking)
 - Neurological deficits
 - Intracranial lesion

Glasgow Coma Scale

GCS

Mild TBI = 13-15

Moderate TBI = 9-12

Severe TBI = 3-8

Glasgow Coma Scale					
Motor Response					
Obeys commands	6				
Localizing responses to pain	5				
Generalized withdrawal to pain	6 5 4 3 2				
Flexor posturing to pain	3				
Extensor posturing to pain	2				
No motor response to pain	1				
Verbal Response					
Oriented	5				
Confused conversation	4				
Inappropriate speech	5 4 3 2				
Incomprehensible speech					
No speech	1				
Eye Opening Response					
Spontaneous eye opening	4				
Eye opening to speech	4 3 2 1				
Eye opening to pain					
No eye opening	1				

Severity Rating for TBI

Severity	GCS	AOC	LOC	PTA	Imaging
Mild	13 - 15	≤ 24 hrs	0 - 30 min	≤ 24 hrs	Neg
Moderate	9 - 12	> 24 hrs	> 30min < 24 hrs	> 24hrs < 7 days	Pos or Neg
Severe	3 - 8	> 24hrs	≥ 24 hrs	≥ 7 days	Pos or Neg

- Consider imaging results when determining level of severity
- Positive Imaging = at least a moderate TBI rating
- GCS not as useful given complications of theater setting
- Use of AOC in Defense Department severity rating

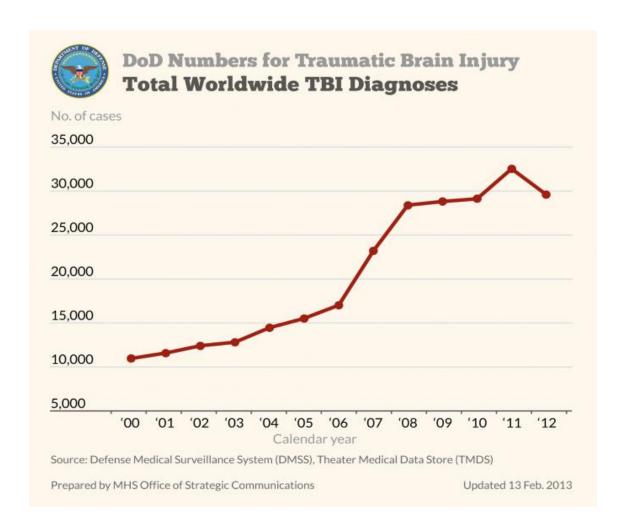
Polling Question #1

Maj. Holland reports to your emergency room after a motorcycle accident one hour prior. A witness reports he was dazed on the scene with a GCS 13 (M5/V4/E4). Currently he is oriented and his GCS is 15, but reports headaches, dizziness and blurred vision. He has a small scalp laceration. Head computerized tomography (CT) is normal.

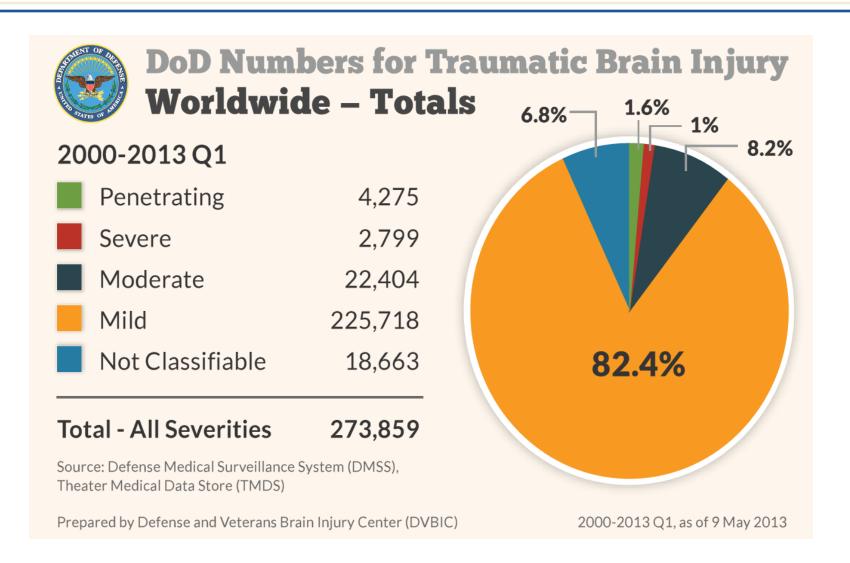
At discharge, he will have a diagnosis of:

- A. Mild TBI/mTBI/concussion
- B. Moderate TBI
- C. Severe TBI
- D. Penetrating TBI

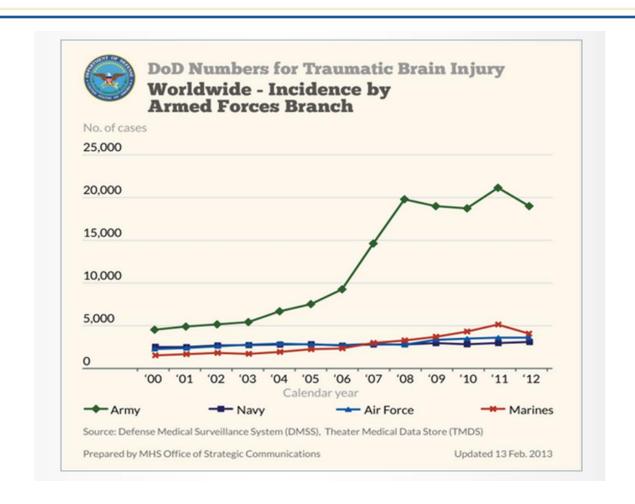
Incidence of TBI by Calendar Year



TBI By Severity Rating



Incidence by Armed Forces Branch



Numbers reported in this graph represent cases with a reported combat operation of Operation Enduring Freedom/Operational Iraqi Freedom/Operation New Dawn and a U.S. Armed Forces affiliation. Since Coast Guard numbers are small, they are not shown.

TBI in the United States

At least
1.7 million
TBIs occur in the
United States
every year

52,000 Deaths

275,000 Hospitalizations

1,365,000 Emergency Department Visits

??? Receiving Other Medical Care or No Care

Mechanisms of Injury

Traumatic Brain Injury Blunt (Closed) Penetrating Fall **GSW** Stab Explosion/blast Fragments **MVC**

Military TBI in the Civilian Setting

- Blast is the most common mechanism of injury in the combat setting.
 - There are four mechanisms of injury. (Blast-related TBIs are likely to have co-existing conditions.)
 - Primary Blast: Atmospheric over-pressure followed by under-pressure or vacuum
 - Secondary Blast: Objects placed in motion (shrapnel)
 - Tertiary Blast: Thrown by the blast wave/wind
 - Quaternary Blast: Other injuries from the blast (i.e., burns and crush injuries)
 - No clear evidence that the types of combat-related concussion are significantly different for blast or blunt trauma from sports physically or on [neuropsychological] testing.

Military TBI in the Civilian Setting

- Between 2000 and 2012, greater than 80 percent of TBIs in the military occurred in the non-deployed setting
 - Occasionally service members/veterans are seen initially in a civilian hospital prior to transfer to a military treatment facility or Department of Veterans Affairs (VA) hospital
- Veterans are typically seen years following their injury due to lack of reporting or screening
- The chronicity of their symptoms becomes more complex for providers, and management can be challenging

Relevance to Civilian Practice

Homeland Security

Not if, but when:

- Approximately 70 percent of terrorist attacks worldwide involve high explosives
- Terrorist attacks are surprisingly simple and deadly, so terrorists have long viewed vehicle bombs as "[o]ne of the best tools to breach security."1

¹ Warned the Federal Bureau of Investigation and the Department of Homeland Security on July 30, 2004. (US News & World Report, July 2004)

Relevance to Civilian Practice

Veterans

- Large participation of reserve and National Guard units in global war on terrorism
- Will eventually return to civilian sector



Traumatic Brain Injury 101

mTBI/Concussion Assessment: Clinical Pearls

TBI Assessment: Domains to Be Examined

- History: Incident, mechanism, acute injury characteristics, symptom course
- Symptoms: Cognitive, emotional, physical
- Neurologic exam: Cranial nerves, postural stability, vision
- Neurocognitive function: Attention, concentration, memory
- Psychological function: Depression, anxiety, irritability

The Interview

- Often helpful to approach the patient in conversation versus repeated questions
- Ask appropriate questions to nail down the entire timeline
 - Get details leading up to, during and after the injury event to identify gaps in memory
- Obtain accurate chronology of symptom onset and progress

Concussion Assessment: Domains

<u>History</u>

- Concussion incident MVC, fall, sports, blast, blunt force trauma
- Mechanisms MVC (contact, acceleration/deceleration, rotational), fall (coup/contracoup), blast (primary, secondary, tertiary)
- Acute injury characteristics LOC/AOC, retrograde amnesia (RA), PTA, headache, dizziness, hearing/vision, nasal/auricular bleeding, poly-trauma/blood loss
- Symptom course Immediate with gradual improvement over 24 hours, minor symptoms with progressive worsening

Mild TBI Assessment: Domains

Symptoms: Systematic inventory

- Interview (acute/subacute; combat setting, local hospital/clinic)
- Tools (subacute/chronic military treatment facilities/ clinic)
 - Neurobehavioral Symptom Inventory (NSI: 22 items)
 - PTSD Checklist (Civilian or Military Version [PCL-C/PCL-M: 17 items])
 - Patient History Questionnaire-9 (PHQ-9: 9+1 items)
 - Drug Abuse Screening Test-20 (DAST-20: 20 items)
 - Dizziness Handicap Inventory (DHI: 25 items)
 - Epworth Sleepiness Scale (ESS: 8 items)

Mild TBI Assessment: Domains (continued)

Neurologic Exam

- Focused cranial nerve exam
- Postural stability/vestibular exam (Dix-Hallpike maneuver, Romberg test)
- Visual function (gross acuity, eye movement, binocular function, visual fields, visual inattention)

Neurocognitive Function

- Mini Mental Status Exam, Military Acute Concussion Evaluation (MACE), Automated Neuropsychological Assessment Metrics (ANAM)
- Full Neuropsychological Evaluation by a specialist

Psychological Function

Depression, anxiety, PTSD, suicidality (interview, tools)

Polling Question #2

Taking a good patient history includes the following:

- A. Concussion incident
- B. Acute injury characteristics
- C. Symptom course
- D. All of the above

Potential Consequences of Screening Errors

- False Positive Errors: Diagnosing someone with a TBI when no TBI occurred
 - -Potentially devastating news to the patient
 - -Misattribution of symptoms to TBI
 - Incorrect focus of treatment leading to longer lasting symptomology

Potential Consequences of Screening Errors (continued)

Causes of false positive screens include:

- Mistaking surprise or shock for AOC
- Not considering significant blood loss
- Not considering onsite sedation
- Diagnosis is based solely on symptom report or cognitive testing results
- Not accurately establishing symptom onset

Potential Consequences of Screening Errors (continued)

- False Negative Errors: Not identifying a TBI when one has occurred
 - Alienating the patient by incorrectly explaining away symptoms
 - Potentially creating long lasting "post-concussive syndrome" by missing chance for early education and intervention
 - Incorrect focus of treatment leading to longer lasting symptomology

Potential Consequences of Screening Errors (continued)

Causes of false negative screens include:

- Not asking enough questions and missing a mTBI/concussion that has occurred in a complex series of events (blast<impact<fall)
- Relying only on a checklist/screening tool
- Lack of overt symptoms taken as lack of injury
- Not performing brain imaging on mTBI/concussion patients and missing greater pathology
- Missing the possibility of an anoxic brain injury

How to Prevent Misdiagnosis and Missed Diagnoses

- Do not rely solely on screening checklists
- Perform a thorough records review to obtain injury characteristics
- Interview other injured unit members or contact their unit (if available)
- Talk with the family (personality/intellect)
- Ask about a previous history of TBI
- Do not over/under diagnose based on symptomology

The Big Four

Symptom Management of Sleep, Cognition, Headaches and Mood

Sleep Disturbances

- 50 percent of patients with TBI have some form of sleep disturbance
- In a study of veterans with TBI, PTSD or chronic pain
 - 93.5 percent of the entire study population had a sleep disorder
 - 65 percent of the population screened positive for mTBI/concussion
- Sleep disturbances may cause harmful consequences on memory function in patients with TBI and/or exacerbate comorbid symptoms
 - May prolong concussion recovery
 - Potentially a risk factor for suicide

Clinical Assessment – Sleep Dysfunction

Common Symptoms

- Insomnia
- Excessive daytime somnolence
- Nightmares
- Parasomnias
- Snoring/sleep apnea

Exam/Clinical Tools

- BMI/body habitus
- Epworth SleepinessScale
- Sleep diary

VA/Defense Department Guidance for Acute Versus Chronic mTBI with Sleep Disturbances

	Management Recommendations ⁷
Acute mTBI	 Patient education on mTBI Provide information on sleep hygiene Advise on the potential effects of medications, caffeine, tobacco and alcohol on sleep Prescribe short-term sleep medications such as non-benzodiazepine sleep agents
Chronic mTBI (>3 months)	 Review medications Evaluate for comorbid psychiatric conditions Provide appropriate pain management Conduct sleep study (refer to a specialist) Provide training in behavioral techniques to improve quality of sleep Implement cognitive behavioral therapy focused on sleep with other behavioral interventions

Changes in "Executive Functioning"

- Decreased awareness of thinking changes
- Difficulty planning/setting goals
- Problems being organized
- Difficulty being flexible
- Difficulty problem-solving
- Difficulty prioritizing

Thinking Changes

Attention

- Reduced visual attention
- Reduced concentration
- -Inability to divide attention between competing tasks

Processing Speed

- —Slow thinking
- -Slow reading
- -Slow oral and written responses

Thinking Changes

- Communication
 - Difficulty finding the right words, naming objects
 - Disorganized in communication
- Learning and Memory
 - Information before TBI intact
 - -Reduced ability to remember new information
 - -Problems with learning new skills

Clinical Assessment: Thinking Changes

- Neurocognitive assessment is recommended once patient is deemed appropriate for testing and/or based on clinical judgment of the medical team
- If deficits are noted in testing, referral for cognitive rehabilitation therapy (i.e., OT, SLP) typically follows



Photo Courtesy of Jynessa Hockaday

Post-traumatic Headaches

Cephalgia remains the most common symptom following mTBI/concussion



Post-traumatic Headache Occurrence in mTBI/Concussion

- The prevalence of chronic daily headaches in returning soldiers after a deployment-related concussion is 20 percent or four to five times higher than that seen in the general U.S. population.
- The headaches resemble chronic migraine and onset is typically within the first week after concussion.

Acute Versus Chronic Post-traumatic Headache After (PTHA)

- Post-traumatic headaches can be divided into acute and chronic following a mild to severe head injury.
 - Acute: Headache develops within seven days following head trauma or after regaining consciousness following head trauma. The headache resolves within three months.
 - Chronic: Headache develops within seven days following head trauma and persists for greater than three months after the injury.

Clinical Assessment – PTHA

<u>History</u>

- When did the headaches begin
- Frequency and duration
- Associated symptoms (i.e., nausea, photophobia, neck pain)
- Alleviating and aggravating factors
- Medications (past and current)
- Diet
- Sleep
- Headache history, if any, prior to TBI

Clinical Assessment – PTHA (continued)

- MIDAS: The Migraine Disability Assessment Test
- HIT: Headache Impact Test
- Headache Diary

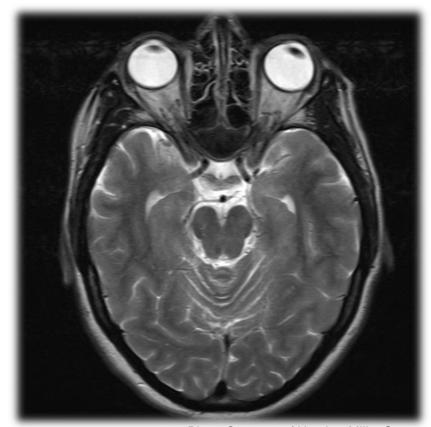


Photo Courtesy of Heather Miller Seger

Pharmacologic Treatment

- Acute Attacks
 - Acetaminophen
 - Nonsteroidal anti-inflammatory drugs (NSAIDs) (do not use first 48 hours after injury)
 - Triptans
- Prophylactic Therapy
 - Tricyclic antidepressants
 - Calcium channel blockers
 - Anticonvulsants
 - Beta blockers

Nonpharmacologic Therapies

- Trigger and risk factor avoidance
- Proper diet, exercise and sleep hygiene
- Use headache diary
- Biofeedback and stress management
- Cognitive therapy and psychotherapy
- Physical therapy, manipulation, acupuncture, reflexology
- According to S.D. Silberstein, S. Holland, F. Freitag, et al., studies show supplements such as Vitamin B-2, magnesium, feverfew, petasites, melatonin and coenzyme Q10 can be considered

Emotional, Behavioral and Social Changes

Increased **Depression** impulsivity Rebellious Irritability/ **Anxiety** agitation Socially Difficulty with inappropriate self initiation behavior Rapid loss of emotional control (short fuse) **Impatience Intolerant Trouble sleeping** Inability to get along **Increased self focus** with others Difficulty **Fatigue** concentrating

Increased risk taking

Emotional, Behavioral and Social Changes (continued)

Appreciate complex interplay of various factors likely to be involved in expression of symptoms

- Psychological factors (e.g., combat stress, depression, irritability)
- Sleep dysfunction
- Comorbid medical conditions
- Normal readjustment issues related to deployment

Polling Question #3

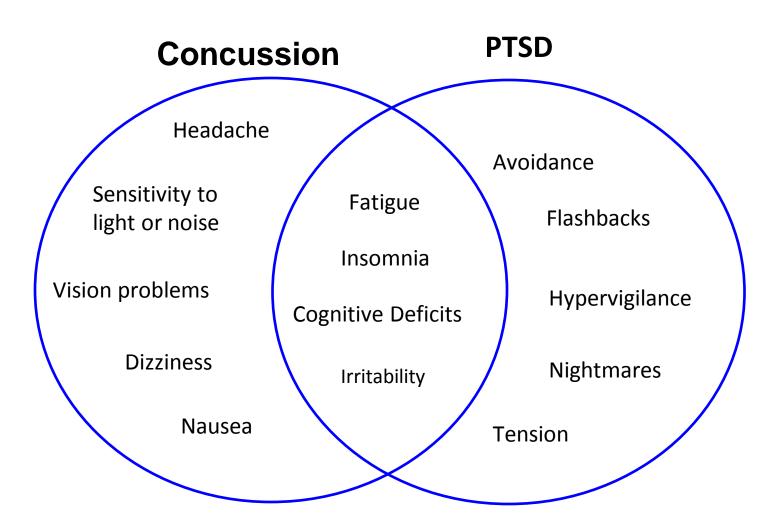
Which sign or symptom is related to posttraumatic stress disorder (PTSD) rather than mTBI/concussion?

- A. Headache
- B. Dizziness
- C. Avoidance
- D. Sensitivity to noise

Posttraumatic Stress Disorder

- According to the DSM-5, the diagnostic criteria identifies the trigger as an exposure to actual or threatened death, serious injury or sexual violation and must result from one or more of the following scenarios, in which the individual:
 - Directly experiences the traumatic event
 - Witnesses the traumatic event in person
 - Learns that the traumatic event occurred to a close family member or close friend (with the actual or threatened death being either violent or accidental) or
 - Experiences first-hand repeated or extreme exposure to aversive details of the traumatic event (not through media, pictures, television or movies unless work-related)

Concussion and PTSD Overlap



Treatment – PTSD and TBI

- Veterans with a history of TBI may necessitate a shift in therapeutic targets
 - May focus more on behavioral strategies if cognitive dysfunction is significant
 - May focus on cognitive restructuring if posttraumatic amnesia is significant
 - May become overwhelmed easily (important to tailor treatment)

Concussion Education: Key To Success!

- Patients, families, providers, military command, employers, teachers
- Early intervention with TBI education and positive expectations have a direct effect on recovery
- Reduces patient and family anxiety

Conclusion

- More than 80 percent of TBIs that occur each year are classified as mTBI/concussion.
- More than 80 percent of all TBIs occur in the nondeployed setting (CONUS).
- Headache is the most common symptom of concussion.
- "The Big Four" TBI symptoms are sleep, headache, mood and cognitive deficits.
- Early intervention and patient education are proven to show faster recovery time
- It is important to provide management through a multidisciplinary approach.

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Understanding Changes to the Posttraumatic Stress Disorder and Acute Stress Disorder Diagnosis in DSM-5

Sept. 5, 2013 1-2:30 p.m. (EDT)

Registration will open on 8/27/13

September							
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